# A COMPARATIVE STUDY ON THE EFFECTIVENESS OF MYOFASCIAL RELEASE TECHNIQUE ALONG WITH ULTRASOUND VERSUS FREE NECK EXERCISES ALONG WITH ULTRASOUND IN THE MANAGEMENT OF UPPER TRAPEZIUS FIBROMYALGIA SUBJECTS

***A dissertation submitted in partial fulfillment of the requirement for the degree of***

**MASTER OF PHYSIOTHERAPY**

**(ELECTIVE – ADVANCED PHYSIOTHERAPY IN ORTHOPAEDICS)**

**To**

**The Tamil Nadu Dr. M.G.R. Medical University**

**Chennai – 600 032**

**April 2013**


**(Reg. No.27111025)**

**RVS COLLEGE OF PHYSIOTHERAPY**

***(Affiliated to the Tamil Nadu Dr. M.G.R Medical University, Chennai – 32)***

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## CERTIFICATE

This is to certify that it is the bonafide work of Mr. V. Prem kumar Reg. No: 27111025 of R. V. S. College of Physiotherapy, Sulur and Coimbatore submitted in Partial fulfillment of the requirements for Master of Physiotherapy Degree course from the Tamil Nadu Dr. M. G. R. Medical University.

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Date:

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**INTERNAL EXAMINER:**

**EXTERNAL EXAMINER:**

**SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR**

**DEGREE OF "MASTER OF PHYSIOTHERAPY"**

**AT**

**THE TAMIL NADU DR. M. G. R. MEDICAL UNIVERSITY,**

**CHENNAI**

**APRIL 2013**

## DECLARATION

I hereby declare and present my thesis work entitled **" A COMPARATIVE STUDY ON EFFECTIVENESS OF MYOFASCIAL RELEASE TECHNIQUE ALONG WITH ULTRASOUND VERSUS FREE NECK EXERCISES ALONG WITH ULTRASOUND IN THE MANAGEMENT OF UPPER TRAPEZIUS FIBROMYALGIA SUBJECTS".**

And also state that the material of this project work has not formed on the basis for the award of any other degree previously from the Tamil Nadu Dr. M. G. R. Medical University, Chennai.

The outcome of original research work undertaken and carried out by me, under the guidance of Prof. Mr. M. K. Franklin Shaju, M. P. T., M. S. P. T., (Ph. D.), R.V.S. College of Physiotherapy, Sulur, Coimbatore.

Place: SIGNATURE

Date:

## ACKNOWLEDGEMENT

First I seek the blessings of the almighty, who has given me the required knowledge, wisdom, strength and opportunity to do this project successfully.

I would like to express my gratitude to our Principal Mrs. R. Nagarani, M. P. T., M. A., (Ph. D), for providing me constant support and motivation in the form of resources and inputs.

I owe my sincere thanks to Prof. Mr. M. K. Franklin Shaju, M. P. T., M. S. P. T., (Ph. D.), my guide for his inspiration, assistance and support, from the inception of this research studies to its completion.

I am grateful to all the patients who have rendered their valuable co-operation during the complete work period of this project.

Finally I thank all my friends, my parents, my beloved wife, child and others who encouraged me in completing the project.

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# I INTRODUCTION

Fibromyalgia is a form of soft tissue rheumatism. A combination of three terms Fibro (from the Latin fibra, or fibrous tissue), myo- (the Greek prefix myos, for muscles), and algia (from the Greek algos, which denotes pain)---fibromyalgia replaces earlier names for the syndrome that are still use by doctors and other health professionals such as myofibrositis, myofascitis, muscular rheumatism, fibrositis, and generalized musculoligamentous strain. Fibromyalgia is not a form of arthritis, since it is not associated with joint inflammation. When the Arthritis Foundation tried to categorize the 150 different from of musculoskeletal conditions in 1963, it created a classification known as soft tissue rheumatism. Included in this listing are conditions in which joints are not involved. Soft tissue rheumatism encompasses the supporting structures of joints (e.g., ligaments, bursae, and tendons), muscles, and other soft tissues.

Fibromyalgia (FM) is merely a term used currently for individuals with chronic widespread musculoskeletal pain for which no alternative cause can be identified.[1] Individuals will sometimes only have on of these “idiopathic” pain syndromes over the course of their lifetime. But more often, individuals with one of these entities, and their family members, are likely to have several of these conditions. Many terms have been used to describe these co-aggregating syndromes and syndromes and symptoms, including functional somatic syndromes, somatization disorders, allied spectrum conditions, chronic multi symptom illnesses, medically unexplained symptoms, etc.

Women are more likely to have these disorders than men, but the sex difference is much more apparent in clinical samples (especially tertiary care) than in

population- based samples Groups of individuals with these conditions (e.g., FM, IBS, headache, TMD,etc.) display diffuse hyperalgesia (increased pain to normally painful stimuli) and/or allodynia (pain to normally non painful stimuli)

Although the term “fibromyalgia” is relatively new, this condition has been described in the medical literature for centuries. Sir William Gowers coined the term “fibrositis” in 1904. During the next half century, fibrositis (as it was then called) was considered by some to be a common cause of muscular pain, by others to be a manifestation of “tension” or “psychogenic rheumatism,” and the rheumatology community, in general, to be a nonentity.

The current concept of fibromyalgia was established by Smyther and Moldofsky in the mid-1970$_s$ The name change reflected an increasing evidence that there was noitis (inflammation) in the connective tissues of individuals with this condition, but instead algia (pain). These authors characterized the most common tender points (regions of extreme tenderness in these individuals), and reported that patients with FM had disturbances in deep and restorative sleep, and that selective stage-4 interruptions induced the symptoms of Fibromyalgia. Yunus and other then reported on the major clinical manifestations of patients with Fibromyalgia seen in rheumatology clinics

The next advance in Fibromyalgia was the development of the American college of Rheumatology (ACR) criteria for Fibrommyalgia, which were published in 1990. This ACR criteria for Fibromyalgia require that an individual have both a history of CWP and the finding 11 or more of 18 possible tender points on examination. Tender points represent nine paired predefined regions of the body, often over musculotendinous insertions[18].

The finding of diffusely increased tenderness, as well as a lack of finding – itis in the muscles or other tissues of fibromyalgia patients, led to the change in the name of this entity from fibrositis of fibromyalgia. The diffuse nature of the pain and tenderness also led many groups of investigators to explore neural mechanisms to explain the underlying pathogenesis of these disorders. If an individual reports pain when a region is palpated with 4kg of pressure, this is considered a positive tender point. Between 25% and 50% of individuals who have CWP will also have l l or more tender points, and thus meet criteria for Fibromyalgia. The prevalence of fibromyalgia is just as high in rural or non-industrialized societies as it is in countries such as the United States

At the time the ACR criteria were published it was thought that there may be some unique significance of the locations of tender points. In fact, a term " control points"was coined to describe areas of the body that should not be tender in Fibromyalgia, and individuals were assumed to have a psychological cause for their pain if they were tender in these regions. Since then, we have learned that the tenderness in Fibromyalgia extends through the entire body. Thus, relative to the pain threshold that a normal non-fibromyalgia patient would experience at the same points, "control" regions of the body such as the thumbnail and forehead are just as tender as in fibromyalgia tender points. The tender point requirement in the ACR criteria not misrepresents the nature of the tenderness in this condition (i.e., local rather than widespread), but also strongly influences the demographic and psychological characteristics of Fibromyalgia. Women are only 1.5 times more likely than men to experience CWP, but are 10 times more likely than men to have 11 or more tender points. another unintended consequence of requiring both CWP and at least 11 tender points to be diagnosed with Fibromyalgia is that many individuals with Fibromyalgia

will have high levels of distress. Wolfe has described tender points as a "sedimentation rate for distress" because of population-based studies showing that tender points are more common in distressed individuals[30]. The changes which occur in tissue involved in the onset of fibromyalgia, it is thought to be initiated by localized sympathetic predominance, associated with changes in the hydrogen ion concentration and the calcium and sodium balance in the tissue fluids. These changes are associated with vasoconstriction and hypoxia/ischemia

Pain results, it is thought, as these alterations affect the pain sensors and proprioceptors. Muscle spasm and hard nodular, localized tetanic contractions of muscle bundles, together with vasomotor and musculomotor stimulation, intensify each other, creating vicious cycle of self-perpetuating impulses.

Research has indicated a strong familial component to the development of fibromyalgia. First-degree relatives of individuals with fibromyalgia display an eightfold greater risk of developing fibromyalgia than those in the general population.[31] these studies also show that family members of individuals with fibromyalgia are much more tender than the family members of controls, regardless of whether they have pain or not. Family members of fibromyalgia patients are also much more likely to have IBS, TMD, headaches, and a host of other regional pain syndromes. This familial and personal co-aggregation of conditions that includes Fibromyalgia was originally collectively termed affective spectrum disorder. In population-based studies, the key symptoms that often co-aggregate besides pain are fatigue, memory difficulties, and mood disturbances. Recent studies have begun to identify specific genetic polymorphisms that are associated with a higher risk of developing Fibromyalgia. To date, the serotonin5-HT2A receptor polymorphism T/T phenotype, serotonin transporter, dopamine4 receptor, and COMT (catecholamine o-

methyl transferase) polymorphisms have all been noted to be seen in higher frequency in fibromyalgia.

Fibromyalgia was rare in self-employed subjects and more common in those with repetitive jobs, and with little job satisfaction like keyboard workers and process workers. On the other hand, it was common in musicians who spend many hours practicing, and who may well be under considerable stress, It could spread rapidly throughout one part of a company but hardly affect similar offices in the same company, even within the same building. Women were more commonly affected than men. The incidence was higher just before school holidays, and, in, seasonal workers (such as fruit pickers), just before the end of the season.

Once fibromyalgia develops the mechanisms responsible for ongoing symptom expression are likely complex and multi factorial. Because of the fact that disparate stressor scan trigger the development of these conditions, the human stress response has been closely examined for a causative role. The human stress response is mediated primarily by the activity of the corticotrophin-releasing hormone (CRH) nervous system located in the hypothalamus and locus-coeruleus nor epinephrine/autonomic (sympathetic/LC-NE) nervous system located in the brain stem. Recent research suggests that although this system in humans has been highly adaptive throughout history, the stress response may be inappropriately triggered by a wide assortment of everyday occurrences that do not pose a real threat to survival, thus initiating the cascade of physiological responses more frequently than can be tolerated. In humans, daily “hassles” and personally relevant stressors seem to be more capable of causing symptoms than major catastrophic events that do not personally impact on the individual

Pain results, it is thought, as these alterations affect the pain sensors and proprioceptors. Muscle spasm and hard nodular, localized tetanic contractions of muscle bundles, together with vasomotor and musculomotor stimulation, intensify each other, creating vicious cycle of self-perpetuating impulses. To complete this vicious circle, thses changes in baseline function of the stress response (i,e., of the autonomic and neuroendocrine systems)that may occur following a stressor earlier in life have been shown to predict which symptom-free individuals without chronic pain or other somatic symptoms are more likely to develop these somatic symptoms. This has been noted both in population-based studies and in experiments where healthy young adults are deprived of regular sleep or exercise.

Because of this link between exposure to “stressors” and the subsequent development of Fibromyalgia, the human stress systems have been extensively studied in this condition. These studies have generally shown alterations of the hypothalamic-pituitary-adernal (HPA) axis and the sympathetic nervous system in Fibromyalgia and related conditions.

One of the earliest findings in this regard was that the tenderness in Fibromyalgia is not confined to tender points, but instead extends throughout the entire body

Early studies typically used dolorimetry to assess pressure pain threshold, and concluded that tenderness was in large part related to psychological factors, because these measures of pain threshold were correlated with levels of distress. Also, nuances such as the rate of increase stimulus pressure, control by the operator versus control by the patient, and patient distress have been shown to influence pain threshold when it is measured in this manner.

In addition to the heightened sensitivity to pressure noted in Fibromyalgia, other types of stimuli applied to the skin are also judged as more painful or noxious by these patients. Fibromyalgia patients also display a decreased threshold to heat, cold, and electrical stimuli. Similar but somewhat attenuated decreases in pain threshold have also been noted in individuals with CWP without 11or more tender points.

## 1.1 AIMS AND OBJECTIVES

- To assess effectiveness of Myofascial Release with Ultrasound therapy on reducing pain of upper trapezius fibromyalgia.
- To assess effectiveness of Myofascial Release with Ultrasound therapy on increasing range of motion of upper trapezius fibromyalgia.
- To assess effectiveness of free neck exercise with Ultrasound therapy on reducing pain of upper trapezius fibromyalgia.
- To assess effectiveness of free neck exercise with Ultrasound therapy on Increasing range of motion of upper trapezius fibromyalgia.

## 1.2 STATEMENT OF THE PROBLEM

A comparative study on the effectiveness of Myofascial Release along with Ultrasound therapy verses Free Neck Exercise along with Ultrasound Therapy in the management of Upper Trapezius Fibromyalgia subjects.

## 1.3 HYPOTHESIS

**1.3.1 Null Hypothesis:** There is no significant difference in Pain and Cervical Neck Flexion Range of Motion following Myofascial Release along with Ultrasound

therapy and Free Neck Exercise along with Ultrasound Therapy on Upper Trapezius Fibromyalgia.

### 1.3.2 Alternate Hypothesis:

There is significant difference in Pain and Cervical Neck Flexion Range of Motion following Myofascial Release along with Ultrasound therapy and Free Neck Exercise along with Ultrasound Therapy on Upper Trapezius Fibromyalgia.

## 1.4 OPERATIONAL DEFINITIONS

### Pain

The pain of fibromyalgia involves muscles, joints, and even skin. It must be present above and below the waist on both sides of the body and involve the axial skeleton (neck, back, or chest) Shoulder and buttock pain, if bilateral, is considered as both sides of the body. The pain attributable to fibromyalgia is poorly localized, difficult to ignore, severe in its characterization, and associated with reduction in the capacity to fulfill roles and responsibilities.

### Visual Analog Scale

Pain intensity can be measured by VAS. A 10 cm line marked with numbers 0 to 10 can be used where 0 symbolizes no pain and 10 is maximum pain. Subject is asked to mark his / her pain on this line as per the severity. clinical application of Visual Analog Scale(VAS) provides a simple technique for measuring subjective experience and it has been established as valid and reliable in a range of clinic and research application and Visual Analog Scale (VAS) are one of the most frequent used measurement scale of pain in health care research and practice.

**Range of Motion**

The most common instruments to use to measure joint position and motion in the clinical setting are the universal goniometer. Typically the design includes a body and two thin extensions called arms-a stationary and a moving am.

**Myofascial Release**

Myofascial release is a form of soft tissue therapy used to treat dysfunction and accompanying pain and restriction of motion. This is accomplished by relaxing contracted muscles, increasing circulation, increasing venous and lymphatic drainage, and stimulating the stretch reflex of muscles and overlying fascia

**Ultrasound Therapy**

Ultrasound refers to mechanical vibrations which are essentially the same as sound waves, but of a higher frequency. Ultrasonic energy or ultrasound describes any vibration at a frequency above the sound range but it is frequencies of a low megahertz that are typically used in physiotherapy. Piezoelectric transducers are used to achieve the high frequency ultrasound energy needed for imaging the therapy. It is therefore measured in watt per square centimeter.

**Free Neck Exercise**

Free neck exercises can be done sitting with upright posture, perform 15-20 reps an hour for upper trapezius-neck bending, neck rotation, shoulder shrugs to develop better posture and to move out of these positions intermittently throughout the workday will place the muscles back at their optimal length while promoting blood flow and oxygen delivery to the muscles.

# II REVIEW OF LITERATURE

**Section A: Literature regarding general aspects of Fibromyalgia.**

**Section B: Literature regarding the reliability of Visual Analogue Scale.**

**Section C: Literature regarding the reliability of Universal Goniometer.**

**Section D: Literature regarding the influence of myofascial release techniques.**

**Section E: Literature regarding the influence of ultrasound therapy.**

**Section F: Literature regarding the influence of free neck exercises.**

## Section A

### Literature regarding general aspects of Fibromyalgia

**Thomas Rizzo et al. (2008)** concluded that , in case of trapezius, the specific areas that are tender depends on which portion of the trapezius is involved ( upper, middle, or lower). The upper trapezius is most commonly involved

**Hess et al. (2004)** stated that, research has indicated a strong familial component to the development of fibromyalgia. First-degree relatives of individuals with Fibromyalgia display and eightfold greater risk of developing Fibromyalgia than those in the general population.

**Williams et al. (2001)** stated that, at the time the ACR criteria were published it was thought that there may be some unique significance of the locations of tender points. In fact, a term “control points” was coined to describe areas of the body that should not be tender in Fibromyalgia, and individuals were assumed to have a psychological

cause for their pain if they were tender in these regions. Since then, we have learned that the tenderness in Fibromyalgia extends throughout the entire body. Thus, relative to the pain threshold that a normal non-fibromyalgia patient would forehead are just as tender as in Fibromyalgia tender points.

**Offenbaecher et al. (1999)**stated that, recent studies have begun to identify spexific genetic polymorphisms that are associated with a higher risk of developing Fibromyalgia. To date, the serotonin5-HT2A receptor polymorphism T/T phenotype, serotonin transporter, dopamine4 receptor, and COMT (catecholamine o- methtl transferase) polymorphism shave all been noted to be seen in higher frequence in Fibromyalgia.

**Wolfe (1997)** has described tender points as a "sedimentation rate for distress" because of population-based studies showing that tender points are more common in distressed individuals.

**Anderson et al. (1995)** in their study they concluded that. Women are only 1.5 times more likely than men to experience CWP, but are 10 times more likely than men to have 11 or more tender points.

**Andruzzi et al. (1993)** in their study they concluded that, women are more likely to have Fibromyalgia than men, but the sex difference is much more apparent in clinical samples (especially tertiary care ) than in population- based samples.

**Yunus et al. (1990)** stated that, the advance in fibromyalgia was the development of the American college of Rheumatology (ACR) criteria for fibromyalgia, which were published in 1990. These ACR criteria for Fibromyalgia require that an individual have both a history of CWP and the finding of 11 or more of 18 possible tender points

on examination. Tender points represent nine paired predefined regions of the body, often over musculotendinous insertions.

**Mayer and Raybould (1990)** stated that, Fibromyalgia (FM) is merely a term used currently for individuals with chronic widespread musculoskeletal pain for which no alternative cause can be identified.

**Pliner et al. (1985)** studied that, family members of fibromyalgia patients are also much more likely to have IBS, TMD, headaches, and a host of other regional pain syndromes.

**England et al. (1975)** concluded that, patients with Fibromyalgia had disturbances in deep and restorative sleep, and that selective stage-4 interruptions induced the symptoms of fibromyalgia.

**Bayer (1950)** stated that, pain results, it is thought, as these alterations affect the pain sensors and proprioceptors. Muscle spasm and hard nodular, localized tetanic intensify each other, creating a vicious cycle of self-perpetuating impulses.

**Peteresen (1934)** stated that, the onset of fibromyalgia is initiated by localized sympathetic predominance, associated with changes in hydrogen ion concentration and the calcium and sodium balance in tissue fluid. These changes are associated with vasoconstriction and hypoxia.

## Section B

### Literature regarding the reliability of Visual Analogue Scale

**Husskisson (1974)** stated that, pain intensity can be measured by Visual Analogue Scale. A 10 cm line marked with numbers 0 to 10 can be used where 0 symbolizes no

pain and 10 is maximum pain. Subject is asked to mark his / her pain on this line as per the severity.

**Sheather et al. (1988)** stated that, clinical application of Visual Analog Scale (VAS) provides a simple technique for measuring subjective experience and it had been established as valid and reliable in a range of clinic and research applications and Visual Analog Scale (VAS) are one of the most frequent used measurement scale of pain in health care research and practice.

## Section C

### Literature regarding the reliability of Universal Goniometer

**Norkin and White (1998)** stated that, the most common instruments to use to measure joint position and motion in the clinical setting are the universal goniometer. Typically the design includes a body and two thin extensions called arms-a stationary and moving arm.

## Section D

### Literature regarding the influence of myofascial release techniques on fibromyalgia

**Thompson (2008)** concluded that, Myofascial Release is a very effective hands-on technique that provides sustained pressure into Myofascial knots to eliminate pain and restore motion. Myofascial release treats that band in the muscle by releasing the uneven tightness in injured fascia.

**Dowling et al. (2005)** stated that, myofascial release is a form of soft tissue therapy used to treat dysfunction and accompanying pain and restriction of motion. This is

accomplished by relaxing contracted muscles, increasing circulation, increasing venous and lymphatic drainage, and stimulating the stretch reflex of muscles and overlying fascia.

**Chaitow and Delany (2002)** stated that, myofascial release techniques are used to improve movement potentials, reduce restriction, release spasm, and ease pain.

**Christopher Quinn et al (2002)** in their study concluded that myofascial release has to be given for 5 minutes included 3 palmar glide while the patient is sitting erect and hanging his hands straight to the side of the chair.

## Section E

**Literature regarding the influence of ultrasound therapy**

**Jarmin et al. (2010)** concluded that, thermal ultrasound might be a comfortable procedure used to soften trigger points in upper trapezius muscle.

**Low & Read (2004)** stated that, continuous mode of ultrasound therapy has been recommended for musculoskeletal disorders, such as muscle spasm, joint stiffness or pain.

**Beggs (2003)** founder and CEO of www.EZUltrasound.com, stated that, ultrasound therapy can be a very effective way to manage the pain of fibromyalgia.

**Sheila Kitchen (2002)** concluded that, thermal effect of ultrasound therpy can be achieved if the temperature of tissue is raised to between 40-50 degree C for at least 5 minutes of application.

## Section F

### Literature regarding the influence of free neck exercises

**Catherine Logan (2006)** stated that, free neck exercises can be done sitting with upright posture, perform 15-20 reps an hour for upper trapezius-neck bending, neck rotation, shoulder shrugs to develop better posture and to move out of these positions intermittently throughout the workday will place the muscles back at their optimal length while promoting blood flow and oxygen delivery to the muscles.

**Robbins (1994)** concluded that, free neck exercises are the most potent procedure available for stopping pain and other symptoms mediated by trigger points.

# III METHODOLOGY

## 3.1 STUDY DESIGN

The research design approach for this study is experimental pre-post test comparative design.

## 3.2 SAMPLING DESIGN

Randomized sampling technique was chosen for this study. 40 patients with Upper trapezius fibromyalgia were distributed in to two equal groups by asking them to pick up chits from a box which is written as Groups B. Each group will consist of 20 patients.

Group A: will be treated with Myofascial release and Ultrasound therapy

Group B: will be treated with Free Neck Exercise and Ultrasound Therapy

## 3.3 STUDY SETTING AND DURATION

RVS hospital, Physiotherapy Out Patient Department, Sulur.

Frequency: 5 days per week for 2 weeks.

## 3.4 STUDY POPULATION

N = 20 (10 subjects in experimental group A & 10 subjects in control group B).

## 3.5 SELECTION CRITERIA

### 3.5.1 Inclusion criteria.

- Clinically diagnosed Upper trapezius fibromyalgia patients
- Age group: 20-30 years

- Both males & females

### 3.5.2 Exclusion criteria

- Cervical radiculopathy
- Cervical myelopathy
- Cervical tumor
- Kyphosis
- Torticollis
- Meningitis
- Cervical rib
- Rheumatoid Arthritis
- Hyperthyroidism

## 3.6 VARIABLES

### 3.6.1 Dependent variable

- Cervical neck flexion
- Pain

### 3.6.2 Independent variable

- Myofascial Release and Ultrasound therapy
- Free Neck Exercise and Ultrasound Therapy

## 3.7 ASSESSMENT TOOL

- Cervical neck flexion by Universal Goniometer.
- Pain by Visual Analogue Scale

## 3.8 PROCEDURE

Source of data were taken up from above places for the study. An ethical clearance was obtained from the ethical committee of Participants included in the study were briefed about the nature of the study and the intervention. After that signed informed written consent was taken from each subject. Pain and cervical flexion were measured before and after intervention.

### 3.8.1 Measurement Procedure

**Pain by Visual Analogue Scale**

The Visual Analogue Scale (VAS) is designed to present to the respondent a rating scale with minimum constraints. Respondents mark the location on the 10-centimeter line corresponding to the amount of pain they experienced. This gives them the greatest freedom to choose their pain with exact intensity. It also gives the maximum opportunity for each respondent to express a personal response style. VAS data of this type is recorded as the number of millimeters from the left of the line with the range of 0 – 100

**Cervical Neck Flexion by Universal Goniometer**

The cervical spine (neck) flexion ROM was measured in sitting position with the thoracic and lumber spine well supported by the back of a chair. The cervical spine is positioned in neutral position. The shoulder girdle is stabilized to prevent

flexion of thoracic and lumber spine. Center the fulcrum of goniometer over the external auditory meatus. Align the proximal arm either perpendicular or parallel to the ground then align the distal arm with the base of the nares and ask the patient to forward bend his/her neck. After the motion of flexion the measurements are recorded.

### 3.8.2 Treatment Procedure

**Myofascial release:**

The patient should be seated erect on chair with arms hang freely. Then mark the tender area with non-toxic marker pen. The practitioner should stand to the side and behind the patient, close to the muscle to be treated. The forearm or lateral aspect of the palm glides slowly medially towards the base of the neck or scapula, while maintaining a firm pressure. As glide is given the patient should equally side bending and turning the head away from the side being treated while maintain erect sitting posture. Myosfascial release has to be given for 5 minutes included 3 palmar glide.

**Ultrasound Therapy :**

An ultrasound therapy unit with the frequency of 3 MHz is used. First patient should be seated comfortable on a chair with back rest. Only treatment area should be exposed and rest of the body should be covered with a towel.

Then apply some gel on the area to be treated. Put the transducer head and move with circular motion on the treatment area while switch on the machine. Increase the intensity to 1.4 W/cm2 for duration of 5 minutes. The machine should be kept on continuous mode, because continuous ultrasound is the most potent procedure available for stopping pain in the trigger points.

**Free Neck Exercise:**

Neck flexion: Patient should be seated erect on chair. lowly bend the neck forward.

Neck extension: Patient should sit erect on chair and slowly bend the neck backward.

Neck lateral flexion: Slowly bend the neck to the side while sitting erect on chair.

Neck rotation: slowly rotate the neck either side of body sitting erect.

Shoulder shrug: Slowly elevate the shoulder while arms are hanging relaxed.

To perform these exercises 15-20 reps an hour.

# IV DATA ANALYSIS AND RESULTS

## 4.1. DATA ANALYSIS

The data collected from 20 subjects were evaluated statistically. Descriptive analytical study was done by using Paired‘t’ test and Unpaired‘t’ test.

a) **Paired ‘t’ test** $\bar{d} = \frac{\sum d}{n}$

$$S = \sqrt{\frac{\sum d^2 - \frac{\left(\sum d\right)^2}{n}}{n-1}}$$

$$t = \frac{\bar{d}\sqrt{n}}{s}$$

Where,

d – Difference between pre test and post test values

—– Mean of difference between pre test and post test values

n – Total number of subjects

s – Standard deviation

**b) Un paired 't' test**

$$s = \sqrt{\frac{\sum(x_{1-}\ \bar{x}_1)^2 + \sum(x_{2-}\ \bar{x}_2)^2}{n_1 + n_2 - 2}}$$

$$T = \frac{\bar{x}_{1-}\ \bar{x}_2}{S} \quad \sqrt{\frac{n_1 n_2}{n_1 + n_2}}$$

Where,

S = Standard deviation

$n_1$ = Number of subjects in Group A

$n_2$ = Number of subjects in Group B

$\bar{x}_1$ = Mean of the difference in values between pre-test and post-test in Group-A

$\bar{x}_2$ = Mean of the difference in values between pre-test and post-test in Group-B

**4.2. Data Analysis of Neck pain in Group A**

Subjects in Group A were given Myofascial Release Technic with UltraSound. Pre test, Post test scores were recorded and statistically analyzed as follows.

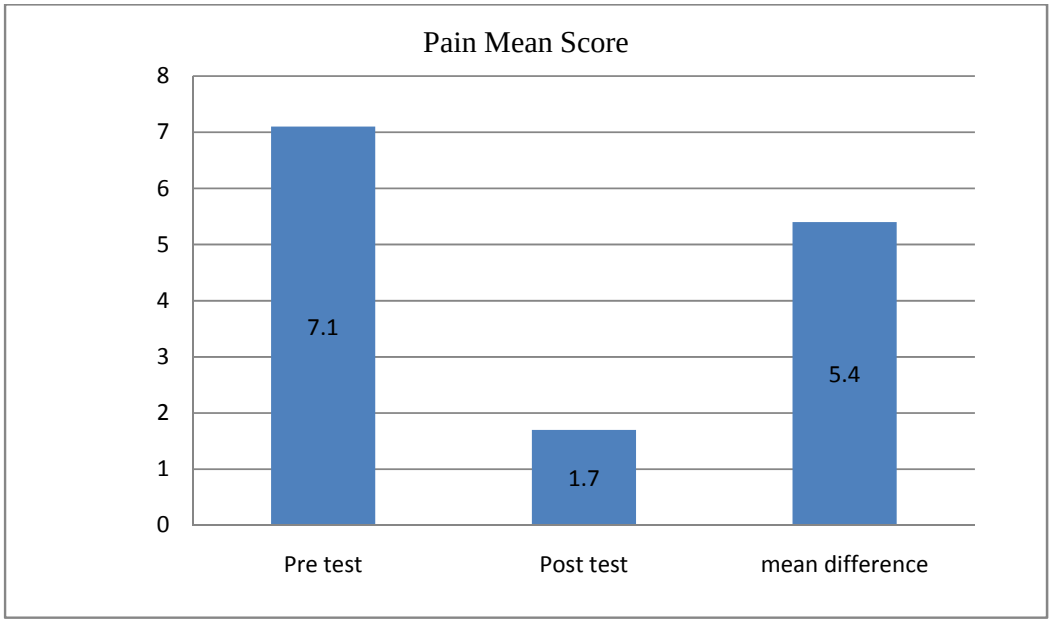
The mean, mean difference, standard deviation and paired 't' value on Pre test, Post test scores of Neck pain in Group A have been analyzed and presented in Table 1

**Table 1:**

| Measurement | Mean | Mean Difference | Standard Deviation | Paired 't' value |
|---|---|---|---|---|
| Pre test | 7.1 | 5.4 | 1.46 | 5.48 |
| Post test | 1.7 | | | |

The calculated paired 't' value for Neck pain in Group A is 5.48. The 't' table value is 2.87 at 0.005 level of significance. Since the calculated 't' value is more than 't' table value, there is significant difference in Pre and Post test scores of Group A. Thus there is significant reduction in pain following Myofascial Release Technique with Ultra Sound among Fibromyalgia Neck pain subjects.

**Figure: 1** Graphical representation of Pre test Mean, Post test Mean and Mean Difference score of Neck pain in Group A




### 4.3. Data Analysis of Neck pain in Group B:

Subjects in Group B were given Free Neck Exercise along with Ultra Sound. Pre test and Post test scores were recorded and statistically analyzed as follows.

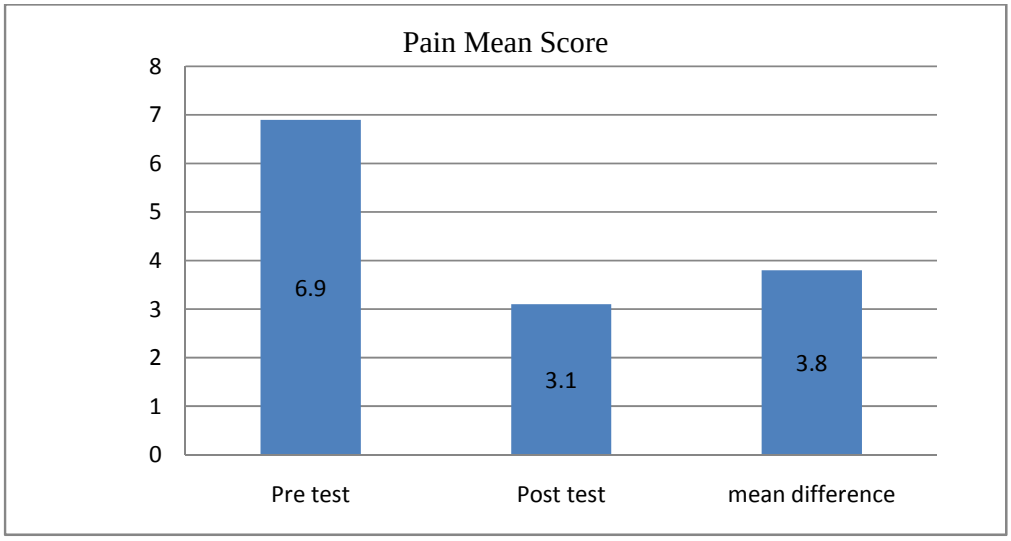
The Mean, Mean Difference, Standard deviation and Paired ‘t’ value on Pre test, Post test scores of Neck pain in Group B have been analyzed and presented in Table 2.

**Table: 2**

| Measurement | Mean | Mean Difference | Standard Deviation | Paired 't' value |
|---|---|---|---|---|
| Pre test | 6.9 | 3.8 | 1.97 | 4.67 |
| Post test | 3.1 | | | |

The calculated paired 't' value for Neck pain in Group B is 4.67. The't' table value is 3.250 at 0.005 level of significance. Since the calculated 't' value is more than 't' table value, there is significant difference in Pre and Post test scores of Group B. Thus there is significant reduction in pain following Free Neck Exercise and Ultrasound Therapy among Fibromyalgia subjects.

**Figure: 2** Graphical representation of Pre test Mean, Post test Mean and Mean Difference score of Neck pain in Group B



### 4.4. Data Analysis of Neck Pain of Group A and Group B

Subjects in Group A and Group B were given Myofascial Release along with Ultrasound therapy and Free Neck Exercise along with Ultra Sound Pre-test, Post-test scores were recorded and statistically analyzed as follows.

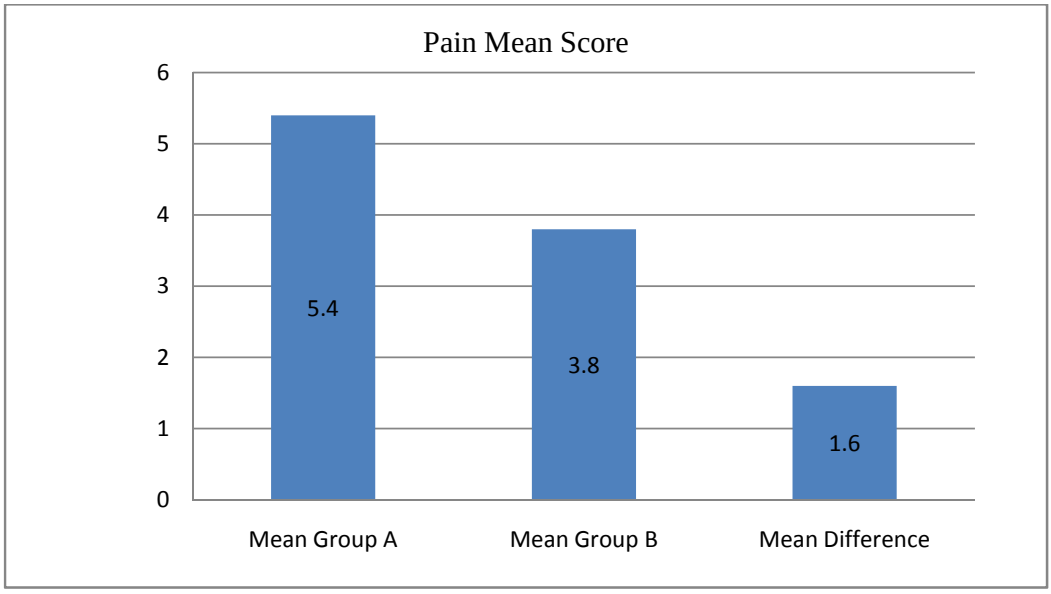
The Mean, Mean Difference, Standard Deviation and Unpaired 't' values of Neck pain in Group A and Group B have been analyzed and presented in Table 3

**Table: 3**

| Serial No | Groups | Improvement | | Standard Deviation | Unpaired 't' test |
|---|---|---|---|---|---|
| | | Mean | Mean Difference | | |
| 1. | Group A | 5.4 | 1.6 | 0.25 | 4.525 |
| 2. | Group B | 3.8 | | | |

The calculated Unpaired 't' value for Neck pain of Group A with Group B is 4.525. The Unpaired 't' table value is 2.878 at 0.005 level of significance. Since the calculated Unpaired 't' value is more than 't' table value, there is significant difference in Neck pain score of Group A with Group B. Thus there is significant difference between Group A and Group B in reducing Neck pain among Fibromyalgia subjects.

**Figure: 3** Graphical representation of Mean and Mean difference of Neck pain values of Group A and Group B.




### 4.5. Data Analysis of Neck Range of Motion in Group A

Subjects in Group A were given Myofascial Release and Ultrasound therapy. Pre test, Post test scores were recorded and statistically analyzed as follows.

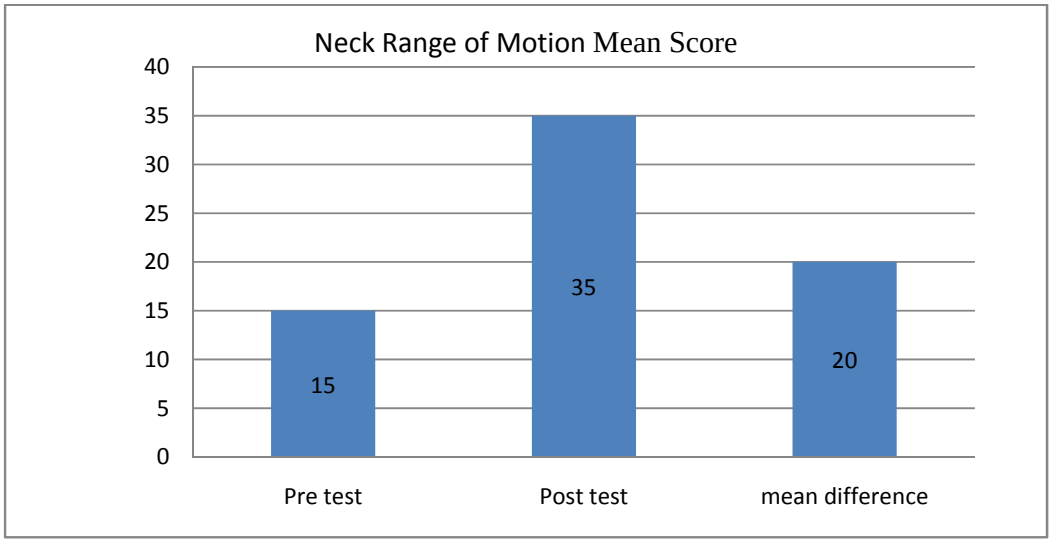
The mean, mean difference, standard deviation and paired 't' value on Pre test, Post test scores of Neck Range of Motion in Group A have been analyzed and presented in Table 4.

**Table 4:**

| Measurement | Mean | Mean Difference | Standard Deviation | Paired 't' value |
|---|---|---|---|---|
| Pre test | 15 | 20 | 9.17 | 10.62 |
| Post test | 35 | | | |

The calculated Paired 't' value for Neck Range of Motion in Group A is 10.62. The 't' table value is 3.250 at 0.005 level of significance. Since the calculated paired 't' value is more than 't' table value, there is significant difference in Pre and Post test scores of Group A. Thus there is significant improvement in Neck Range of Motion following Myofascial Release and Ultrasound therapy among Fibromyalgia subjects.

**Figure: 4** Graphical representation of Pre test Mean, Post test Mean and Mean Difference score of Neck Range of Motion in Group A



### 4.6. Data Analysis of Neck Range of Motion in Group B

Subjects in Group B were given Free Neck Exercises with Ultra Sound. Pre test and Post test scores were recorded and statistically analyzed as follows.

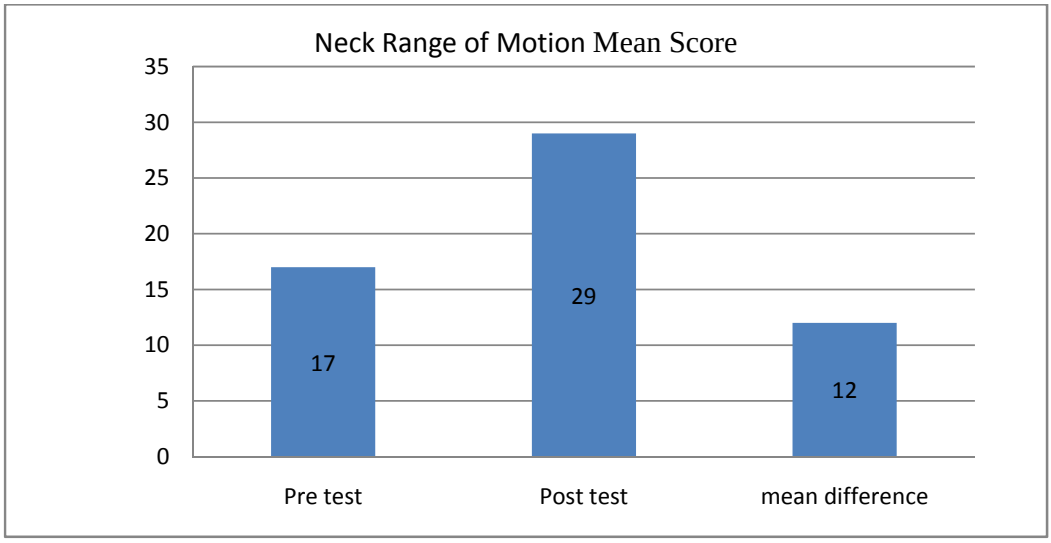
The Mean, Mean Difference, Standard deviation and Paired ‘t’ value on Pre test, Post test scores of Neck Range of Motion in Group B have been analyzed and presented in Table 5.

**Table: 5**

| Measurement | Mean | Mean Difference | Standard Deviation | Paired ‘t’ value |
|---|---|---|---|---|
| Pretest | 17 | 12 | 5.22 | 7.87 |
| post test | 29 | | | |

The calculated paired ‘t’ value for Neck Range of Motion in Group B is 7.87. The paired ‘t’ table value is 3.250 at 0.005 level of significance. Since the calculated paired ‘t’ value is more than ‘t’ table value, there is significant difference in Pre and Post test scores of Group B. Thus there is significant improvement in Neck Range of Motion following Free Neck Exercises with Ultra Sound among Fibromyalgia subjects.

**Figure: 5** Graphical representation of Pre test Mean, Post test Mean and Mean Difference score of Neck Range of Motion in Group B.




### 4.7. Data Analysis of Neck Range of Motion of Group A and Group B

Subjects in Group A and Group B were given Myofascial Release Technique along with Ultra Sound and Free Neck Exercises along with Ultra Sound. Pre-test, Post-test scores were recorded and statistically analyzed as follows.

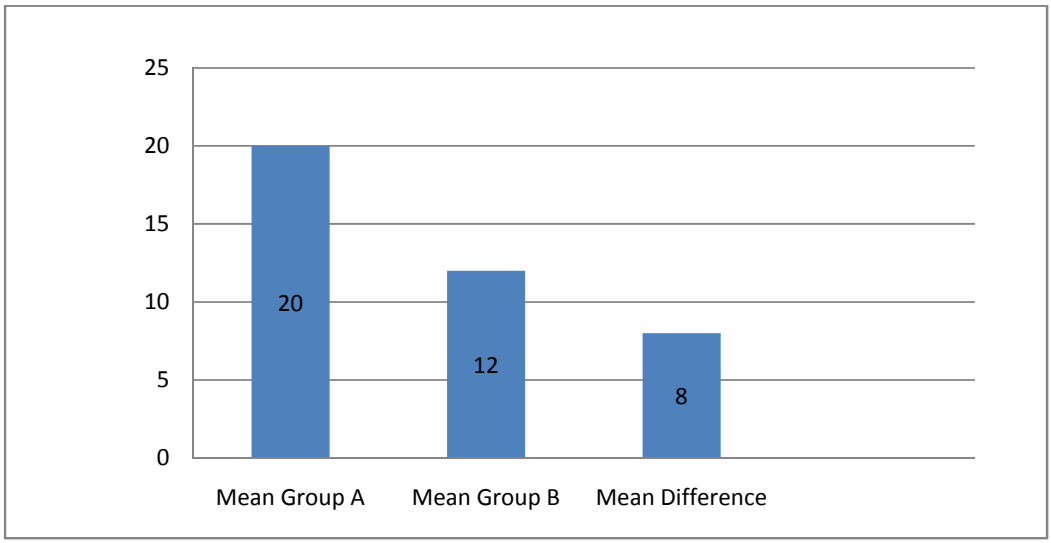
The Mean, Mean Difference, Standard Deviation and Unpaired 't' values of Neck Range of Motion in Group A and Group B have been analyzed and presented in 6$^{th}$ Table.

**Table: 6**

| S. No | Groups | Improvement | | Standard Deviation | Unpaired 't' test |
|---|---|---|---|---|---|
| | | Mean | Mean Difference | | |
| 1. | Group A | 20 | 8 | 10.04 | 4.21 |
| 2. | Group B | 12 | | | |

The calculated Unpaired 't' value for Neck Range of Motion of Group A with Group B is 4.21. The Unpaired 't' table value is 2.878 at 0.005 level of significance. Since the calculated Unpaired 't' value is more than 't' table value, there is significant difference in Neck Range of Motion score of Group A with Group B. Thus there is significant difference between Group A and Group B in improving Neck Range of Motion among Fibromyalgia subjects.

**Figure: 6** Graphical representation of Mean and Mean difference of Neck Range of Motion values of Group A and Group B.




**4.8. Results**

The number of subjects for the study was 20(N=20).The subjects were divided into two groups , Group ‘A’ and Group ‘B’, each group consisting of 10 subjects. Total treatment program was for a period of 2 weeks. Before the treatment started Group A and Group B were involved for pre-test assessment by Visual Analogue Scale (VAS) for pain and Universal Goniometer for Neck Flexion Range of Motion. Post-test assessments were repeated after the treatment for both the Groups. Group A was treated with Myofascial Release Technique with Ultra Sound and Group B was treated with Free Neck Exercises with Ultra Sound.

The calculated paired ‘t’ value for Neck Pain in Group A is 5.48 and Group B is 4.67. The ‘t’ table value is 3.250 at 0.005 level of significance. Since the calculated ‘t’ value is more than ‘t’ table value, there is significant difference in Pre and Post test scores of Pain in Group A and Group B. Thus there is significant reduction in Neck Pain following Myofascial Release Technique along with Ultra Sound and Free Neck Exercises with Ultra Sound among Fibromyalgia subjects.

The calculated paired ‘t’ value for Neck Range of Motion in Group A is 10.62 and Group B is 7.87. The ‘t’ table value is 3.250 at 0.005 level of significance. Since the calculated ‘t’ value is more than ‘t’ table value, there is significant difference in Pre and Post test scores of Neck Range of Motion in Group A and Group B. Thus there is significant improvement in Neck Range of Motion following Myofascial Release Technique along with Ultra Sound and Free Neck Exercises along with Ultra Sound among Fibromyalgia subjects.

The calculated Unpaired ‘t’ value of Neck Pain of Group A and Group B is 4.525 and Neck Range of Motion of Group A and Group B is 4.21. The ‘t’ table value is 2.878 at 0.005 level of significance. Since the calculated Unpaired ‘t’ value is more than ‘t’ table value, there is significant difference in Neck Pain and Neck Range of Motion score among Group A and Group B. Thus there is significant difference between Group A and Group B in reducing Knee Neck Pain and Neck Range of Motion among Fibromyalgia subjects. So we accept Alternate hypothesis $H_{A1}$ and $H_{A2}$ and reject Null hypothesis $H_{01}$ and $H_{02.}$

# V DISCUSSIOIN

Fibromyalgia is a common disorder of unknown etiology characterized by chronic musculoskeletal pain and increased tenderness at standardized tender point. There is a reduced pain threshold, hyperalgesia and allodynia. Additional symptoms are fatigue, sleep disturbances, deconditioning and reduced quality of life. The specific areas that are tender depends on which portion of the trapezius is involved (upper, middle, or lower) the upper trapezius is most commonly involved. It is thought that the condition is common and under disagnosed. Usual age of presentation is 20-50 years but has been diagnosed in children, adolescent and older people. Women are 10 times more commonly affected than men.

This study was undertaken to det ermine the effects of Myofascial release with Ultrasound therapy versus Ultrasound therapy with free neck exercise in the treatment of Upper trapezius Fibromyalgia for reducing pain with the help of Visual Analogue Scale and increasing Range of Motion with the help Universal goniometer.

**Tompson (2008)** stated that, myofascial Release is a very effective hands-on technique that provides sustained pressure into muofascial knots to eliminate pain and restore motion. In upper trapezius fibromylgia several treatment modalities have been applied. He also stated that **myofascial** release is the standard therapy for upper trapezius fibromyalgia.

**Mahaffey et al. (2010)** investigated that, thermal ultrasound over latent trigger points is comfortable and can decrease stiffness of a trigger point in upper trapezius muscles. Therapeutic ultrasound also has a significant effect on fibromyalgia but in specific does and mode like thermal does and continuous mode.

Many systematic reviews and randomized clinical trials have suggested that Myofascial release could be an effective physical therapy intervention for decreasing pain and functional loss or disability for patients with Upper trapezius Fibromyalgia so as Ultrasound therapy. So it is obvious that both Myofascial release and Ultrasound Therapy could be very effective for upper trapezius fibromyalgia. In this study, the researcher found that Myofascial release with Ultrasound therapy on Upper trapezius Fibromyalgia

In the present study, we compared the result obtained after 10 treatment sessions over a period of 2 consecutive weeks with MFR with UST and UST with free neck exercises in subjects diagnosed with Upper trapezius Fibromyalgia. The subjects treated with MFR with UST showed greater reducing in pain through VAS and more increase in ROM through Universal goniometer respectively compared to subjects being treated with UST with Free Neck Exercises.

# VI CONCLUSION

The purpose of this study is 'to compare the effectiveness of Myofascial release with ultrasound therapy and general neck exercises with ultrasound therapy in upper trapezius fibromylgia' by using Visual Analogue Scale for pain and Universal goniometer to measure range of Motion.

Subjects (n=40) included in the study were given Myofascial release with Ultrasound Therapy and Ultrasound Therapy with Free neck exercises for 5 days a week for 2 weeks. 40 subjects were divided into 2 groups:

Group 'A': Subjects treated with Myofascial release with Ultrasound Therapy.

Group 'B': subjects treated with Ultrasound Therapy with Free neck exercises.

Prior to treatment, on the first day VAS and ROM is documented. Post treatment VAS and ROM is documented $10^{th}$ day.

The treatment scores measured in both groups were compared using Student-t test. In both the groups there are significant improvements in scores Visual analogue scale and Range of Motion. The improvements in Group – A were more significant than Group-B. so, Myofascial release with Ultrasound Therapy program of 2 weeks duration proved to be an effective method to reduce pain through Visual Analogue Scale and increase Range of Motion through Universal gonimeter.

## 6.1 LIMITATION

- In this study the researcher have used the small sample size.
- There was no follow up after treatment.
- Duration of the study is only 2 weeks.

- Study mostly dependent on modalities and exercises.

## 6.2 RECOMMENDATIONS FOR FURTHER STUDIES

- Further studies can be done using large sample size.
- Duration of the study can be more than 2 weeks.
- Further studies can be done including other Physiotherapy treatment modalities and exercises.

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## VIII ANNEXURE

## 8.1 PATIENT CONSENT FORM

I ……aged……yrs, voluntarily consent to participate in the research named **"A Comparative study on Effectiveness of Myofascial release technique along with Ultrasound versus Free Neck Exercises along with Ultrasound in the management of Fibromyalgia subjects."**

The researcher has explained me the treatment approach in brief, risk of participation and has answered all the questions pertaining to the study to my satisfaction.

**Signature of Subject** **Signature of Researcher**

**Signature of Witness**

## 8.2 ASSESSMENT PROFORMA / DATA COLLECTION SHEET

[A] SUBJECTIVE ASSESSMENT:

[1] PERSONAL PROFILE :

Name : Group :

Age : Subject No :

Sex : Date :

Occupation :

Address _____

_____

_____

_____

Contact No : (M) _____

(R) _____

Referred by :

Duration :

[2] CHIEF COMPLAINT :

_____

_____

_____

_____

_____

[3] HISTORY :

Present history:

_____

_____

_____

_____

_____

Past history:

_____

_____

____Person

al history :

Socio – economic history:

Pain history:

a. Intensity: VAS 0 1 2 3 4 5 6 7 8 9 10

No pain Moderate Worst Pain

b. Onset : Sudden / Gradual

c. Side :

d. Site :

e. Type :

f. Pattern : Constant / Intermittent

g. Aggravating factor :

h. Relieving factor :

[B] OBJECTIVE ASSESSMENT:

[1] ON OBSERVATION:

Built:

Posture:

Attitude of limb:

Swelling:

Deformity:

Tropical changes:

[2] ON PALPATION:

Warmth:

Tenderness:

Spasm:

Oedema:

[3] ON EXAMINATION:

Sensory examination: Superficial – touch, Pressure, Pain.

Muscle tone:

Manual muscle testing: Neck –

Flexors:

Extensors:

Side flexors:

RANGE OF MOTION

First day of treatment

| Active ROM | Passive ROM |
|---|---|
| Flexion | |
| Extension | |
| Side flexion | |
| Rotation (left) | |
| Rotation (right) | |

Last day treatment

| Active ROM | Passive ROM |
|---|---|
| Flexion | |
| Extension | |
| Side flexion | |
| Rotation (left) | |
| Rotation (right) | |

PAIN SCALE: (VISUAL ANALOGUE SCALE)

Day 1: 0 5 10

No Pain Moderate Pain Maximum Pain

Day 10: 0 5 10

No Pain Moderate Pain Maximum Pain

[6] INVENSTIGATION:

[7] DIAGNOSIS:

[8] (TREATMENT ) SESSIONS IN 2 WEEKS

As per group in which patients are randomly selected.

GROUP ‘A’

MYOFASCIA RELEASE

- 5 minutes included 3 palmar glide

ULTRASOUND THERAPY

- Intensity : 1.4 W/cm2

- Mode : Continous

-Duration : 5 mins.

GROUP ‘B’

ULTRASOUND THERAPY

- Intensity : 1.4 W/cm2

- Mode : Continous

-Duration : 5 mins.

EXERCISE

Neck exercises - /flexion, Extension, Side flexion, Rotation.